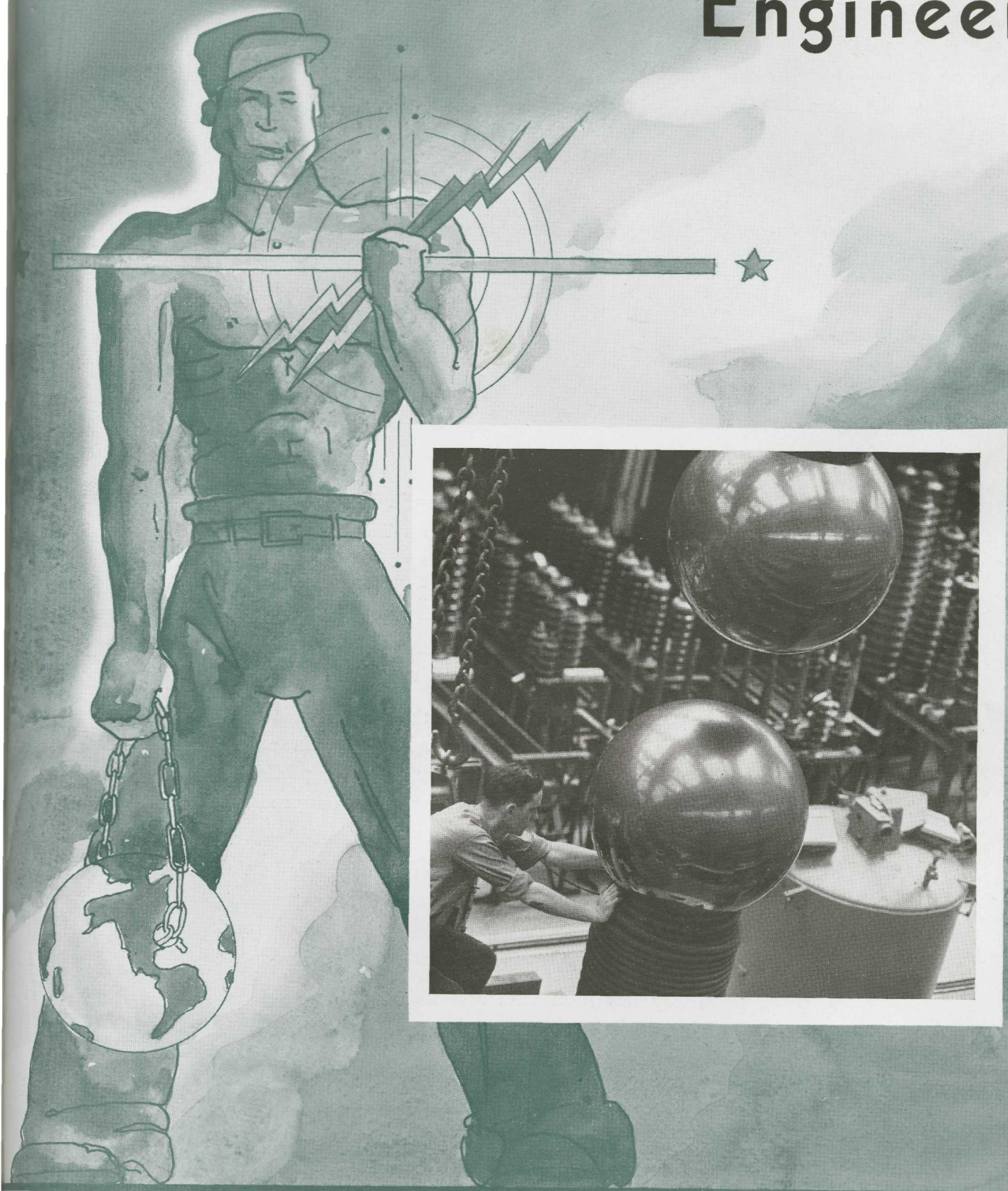
The Ohio State Engineer



May 1943

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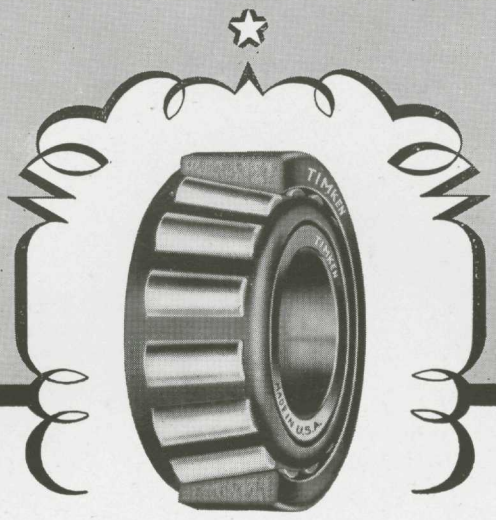
KNOWING YOUR BEARINGS GETS RESULTS



The war production program is a good example of the value of "knowing your bearings". For many years before the war, engineers were putting Timken Tapered Roller Bearings into industrial machinery of all kinds. They discovered long ago that these bearings possessed every quality needed to meet any type of service—friction elimination; radial, thrust and combined load capacity; and the ability to hold moving parts in correct and constant alignment.

Thus, when America was faced with the most tremendous production job ever known, industry had one big advantage —namely, production machines with the speed, precision and endurance to do it; machines that could out-produce any others in the world.

Now the results are beginning to tell on the world's battle fronts—where Timken Bearing Equipped fighting machines turned out by Timken Bearing Equipped production machines are steadily turning the tide of war in our favor.

When Victory has been won and industry calls you to help in the work of reconstruction, you'll find a thorough knowledge of Timken Bearings one of your most valuable assets. Begin to get it now.

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS

"PERISCOPE ON THE STARBOARD QUARTER!"

IN SUBMARINE-infested waters, a speeding destroyer must be able to change its course in a split-second—to drop its deadly ashcans on enemy U-boats.

The secret of the destroyer's great *speed* and *maneuverability* is the tremendous power of its turbines, operating at steam temperatures *high enough to make the turbine blades glow!*

This introduces a difficult problem in turbine construction. The highly heated metal parts "creep" under stress. The metallic grains slowly slide over each other. The metal tends to *flow* out of shape.

Excessive "creep" would quickly destroy the turbine — due to collision between the blades and other parts of the turbine, which are spaced only a *fraction of an inch apart* for maximum power.

Westinghouse first introduced the steam turbine in the United States and has built thousands during the past 45 years.

And much of the success of Westinghouse steam turbines is due to the intensive studies of "creep"— similar to those conducted by Dr. A. Nadai, P. G. McVetty, and M. J. Manjoine, in the Westinghouse Research Laboratories.

As a result of this research, the "creep" in some turbine metals has been reduced to 1/10,000th of an inch per inch per year—less than 1/64th inch per inch in 100 years.

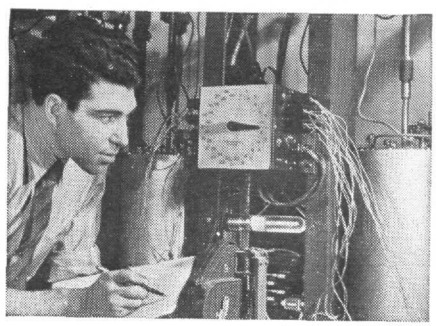
This has guided the development of metals capable of operating at greatly increased temperatures and speeds—and secured *more power per pound of turbine,* a vital necessity in a destroyer!

* * *

Research Engineer Manjoine, in collaboration with Dr. Nadai, is fighting a deadly battle against the submarine menace — by improving metals that make possible *faster, more maneuverable* ships for our Navy.

Manjoine is typical of the many young engineering graduates who are putting Westinghouse skill and "know how" to work for victory—and for a better kind of civilization when peace returns.

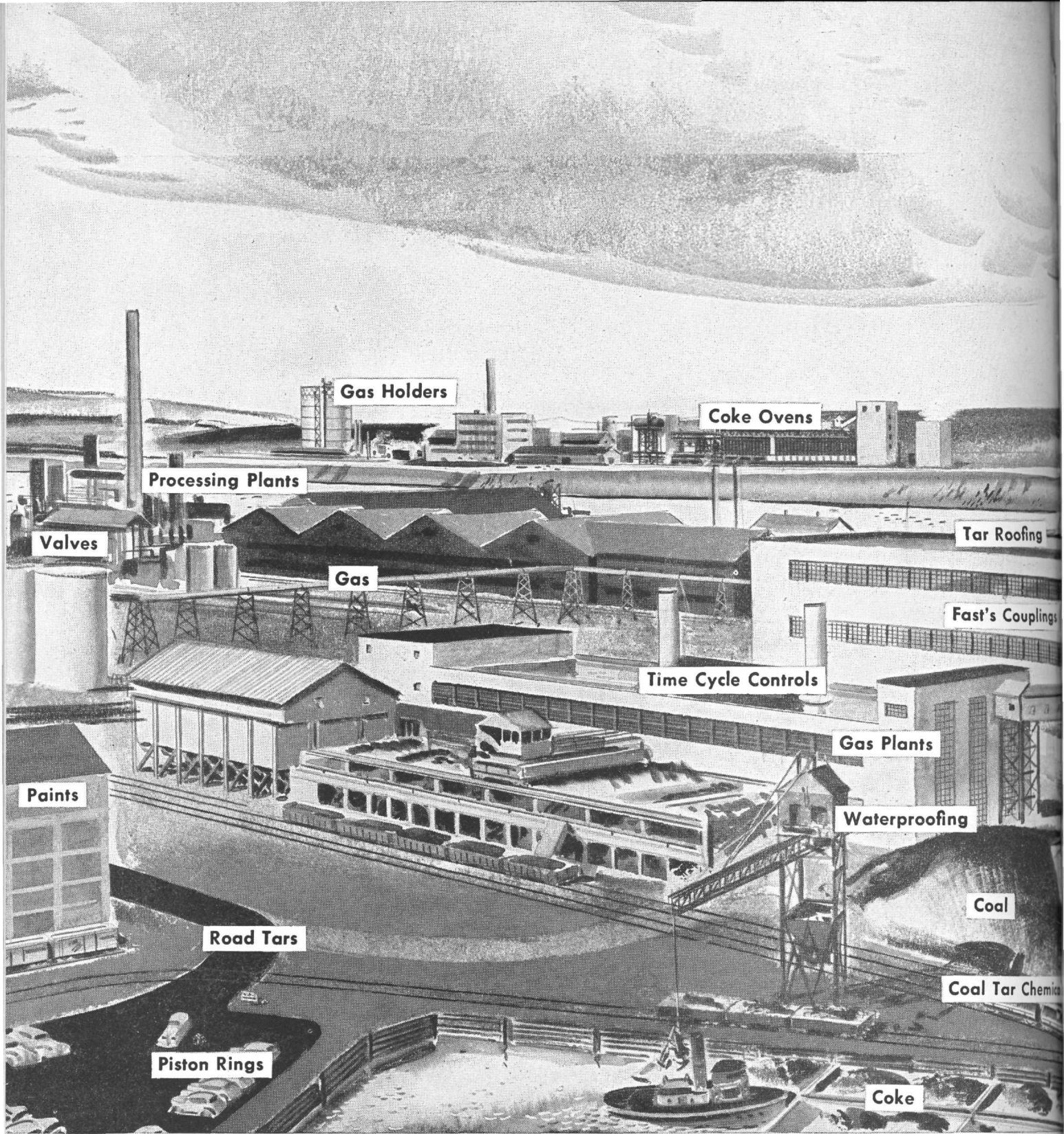
Westinghouse Electric & Manufacturing Company, Pittsburgh, Pennsylvania.



Slower "creep" means faster ships — Research Engineer Manjoine studies "creep" of test samples to develop turbine metals that will deliver more horsepower per pound—making our destroyers speedier and deadlier. Manjoine received his B. S. from Iowa State College, before joining Westinghouse in 1937.

Westinghouse

PLANTS IN 25 CITIES OFFICES EVERYWHERE



"The most fascinating business in America"

The unlocking of the treasure house that lies sealed in a lump of coal has been called the most fascinating business in America. It touches every industry. That is why Koppers has been called the industry that serves all industry. Here are some materials which Koppers supplies to the chemical industry . . . . which is only one of dozens of industries it serves in comparable manner. Koppers Company and Affiliates, Pittsburgh, Pa.

KOPPERS

THE INDUSTRY THAT SERVES ALL INDUSTRY

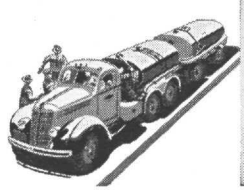
Ability to produce for ourselves and our allies is completely dependent on the generation of power—the energy that turns the wheels of industry. The common enemy of power is water-deposited scale. It must be removed, if boilers are to deliver their full quota of B.T.U.'s. The conventional practice for scale removal is a manual operation consuming much time. Chemistry has stepped in and now provides an efficient method that removes the scale in a few hours.

This is an industrial service developed by Dowell Incorporated, subsidiary of The Dow Chemical Company, with eleven years' experience in the chemical treatment of oil and gas wells. Dowell service uses chemical solutions for the disintegration and removal of deposits coating heat exchange surfaces. Precious time, manpower, equipment are saved. Thus chemistry is assisting industry in maintaining its "balance of power."

THE DOW CHEMICAL COMPANY, MIDLAND, MICHIGAN

New York—St. Louis—Chicago—Houston—San Francisco—Los Angeles—Seattle

DOWELL



DOW

CHEMICALS INDISPENSABLE TO INDUSTRY AND VICTORY

The OHIO STATE ENGINEER

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OUR COVER

Regulation of high voltage, 75,000 volts, with a spark gap. Courtesy Westinghouse.

OUR FRONTISPIECE

Night work on a dam. Note multitude of individual concrete forms and cable line tower in rear.

Courtesy Allis-Chalmers

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